

EXECUTIVE SUMMARY

Thank you for your continued hard work sampling **Webster Lake, Franklin** this year! Your monitoring group sampled the deep spot **four** times and the tributaries **six** times this year and has done so for many years. As you know, conducting multiple sampling events each year enables DES to more accurately detect water quality changes. Keep up the great work!

The New Hampshire Department of Environmental Services (DES), in conjunction with the U.S. Environmental Protection Agency (EPA) and the environmental consulting firm AECOM, conducted a Total Maximum Daily Load (TMDL) for total phosphorus for your lake. The TMDL refers to the pollutant reductions a waterbody needs to meet New Hampshire's water quality standards. Webster Lake was listed on the 2008 impaired waters [303(d)] list because elevated algal growth impaired the primary contact recreation (swimming) use. Phosphorus is the nutrient responsible for algal growth and is the pollutant to be reduced to control algal growth. DES is required by the Federal Clean Water Act (CWA), Section 303(d), to report every two years to the EPA on all waters not meeting state water quality standards.

The TMDL conducted at your lake identified an in-lake target phosphorus value that, when met, should result in no additional primary contact recreation impairments due to algal growth. A phosphorus budget was constructed, phosphorus sources identified and phosphorus reductions allocated to each of the sources to meet the target value. An implementation plan provides recommendations on watershed remediation activities to reduce phosphorus inputs to the lake.

The draft TMDL will be provided to your lake association, town, and watershed stakeholders for review and will also be available on the DES website at www.des.nh.gov/organization/divisions/water/wmb/tmdl/index.htm. There will be a period for public review and comment, anticipated for Summer 2009, where DES and/or AECOM will present it's findings to interested stakeholders. We anticipate a TMDL informational session in conjunction with the annual VLAP Workshop scheduled for May 16, 2009. We encourage your lake association and/or residents to attend the workshop to learn more about TMDLs in general and the TMDL for your lake. Phosphorus load reductions can only occur with the knowledge, participation and action of watershed residents, businesses and stakeholders. If you are interested in participating in an informational session at the VLAP Workshop please contact the VLAP Coordinator at sara.steiner@des.nh.gov or 603-271-2658. If you are interested in learning more about the TMDL Program, or attending additional informational sessions, please contact Peg Foss, TMDL Coordinator, at Margaret.foss@des.nh.gov or 603-271-5448.

Volunteers from your lake participated in the Lake Host™ Program this year. The Lake Host™ Program is funded through DES and Federal grants. The program was developed in 2002 by NH LAKES and NHDES to educate and prevent boaters from spreading exotic aquatic plants to lakes and ponds in New Hampshire. Since then, the number of participating lakes and ponds and volunteers has doubled, the number of boats inspected has tripled, and the number of “saves” (exotic plants discovered) has increased from four in 2002 to a total of 224 in 2008. The program is invaluable in educating boaters and protecting NH’s waterbodies from exotic aquatic plant infestations, thereby preventing recreational hazards, property value decline, aquatic ecosystem decline, aesthetic issues, and saving costly remediation efforts. Lake Host™ staff discovered the following aquatic vegetation entering or leaving your lake in 2008:

Coontail (native)

Great work! We encourage volunteers to continue participating in the Lake Host™ Program to protect the future of your lake.

Sucker Brook Watershed

In 2007, the DES Watershed Management Bureau added Sucker Brook to the Volunteer River Assessment Program (VRAP). VRAP volunteers collected water quality samples at five sample sites established during previous testing of Sucker Brook in 2005 and 2006. These five sites were routinely monitored for pH, conductivity, dissolved oxygen, total phosphorus and total suspended solids two to three times during the summer months in 2007 and 2008.

In addition, a stream gauge was established in 2007 on Sucker Brook, approximately 200 feet upstream of the Lake Shore Drive bridge crossing. It is strongly encouraged that VLAP volunteers record the staff gauge measurement during VLAP sampling of Sucker Brook. This will provide the necessary information to generate pollutant load estimates for Sucker Brook, the largest lake tributary.

Staff gauge measurements and total phosphorus samples were collected weekly during 2008 by DES. Preliminary data assessment indicates that phosphorus loading is less than 0.1 kg/day during most times of the year, with loads of 0.5 to 1.0 kg/day following major rain and runoff events.

Griffin Beach

In 2008, the City of Franklin received a DES Local Watershed Initiative Grant to fund an investigation on stormwater management at Griffin Beach, on the northeast side of Webster Lake. Currently stormwater flows overland, crossing a dirt parking lot and the beach, causing substantial erosion. Reducing sediment loads will help reduce phosphorus inputs to the lake, which already experiences excessive phosphorus loading, causing algal blooms in late summer and early fall.

The City of Franklin is working with Vanasse, Hangen and Brustlin, Inc. to design a more stable parking area. Concept designs currently include a parking lot using porous asphalt, bioretention and increased tree and shrub plantings. It is anticipated that plans and permitting can be finalized in early 2009 and construction in the late summer or early fall of 2009.

OBSERVATIONS & RECOMMENDATIONS

DEEP SPOT

➤ Chlorophyll-a

Chlorophyll-a, a pigment found in plants, is an indicator of algal or cyanobacteria abundance. Algae are typically microscopic plants that are naturally found in the lake ecosystem. The measurement of chlorophyll-a in the water gives biologists an estimation of the algal concentration or lake productivity. Table 14 in Appendix A lists the current year chlorophyll-a data.

Figure 1 depicts the historical and current year chlorophyll-a concentration in the water column.

The median summer chlorophyll-a concentration for New Hampshire's lakes and ponds is 4.58 mg/m³.

The current year data (the top graph) show that the chlorophyll-a concentration **increased slightly** from **June** to **July**, **increased greatly** from **July** to **August**, and then **decreased slightly** from **August** to **September**.

The chlorophyll-a concentrations for August and September were the **highest (worst)** concentrations measured since monitoring began.

The historical data (the bottom graph) show that the **2008** chlorophyll-a mean is **greater than** the state median and similar lake medians. For more information on the similar lake median, refer to Appendix D.

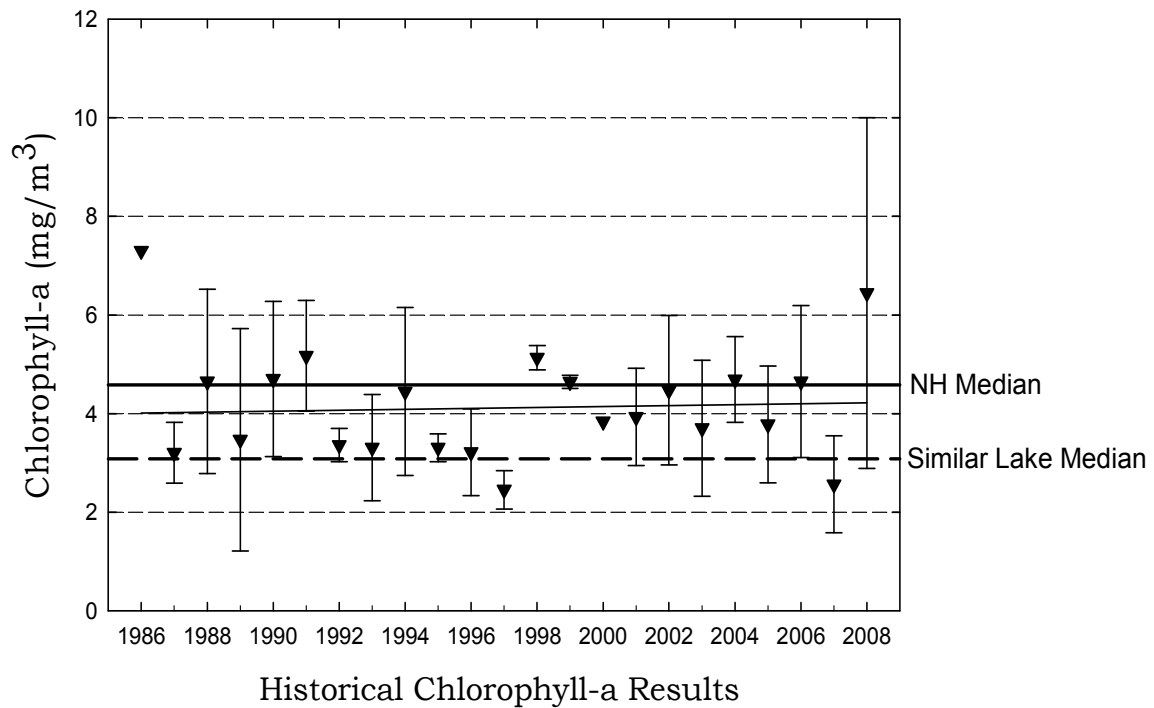
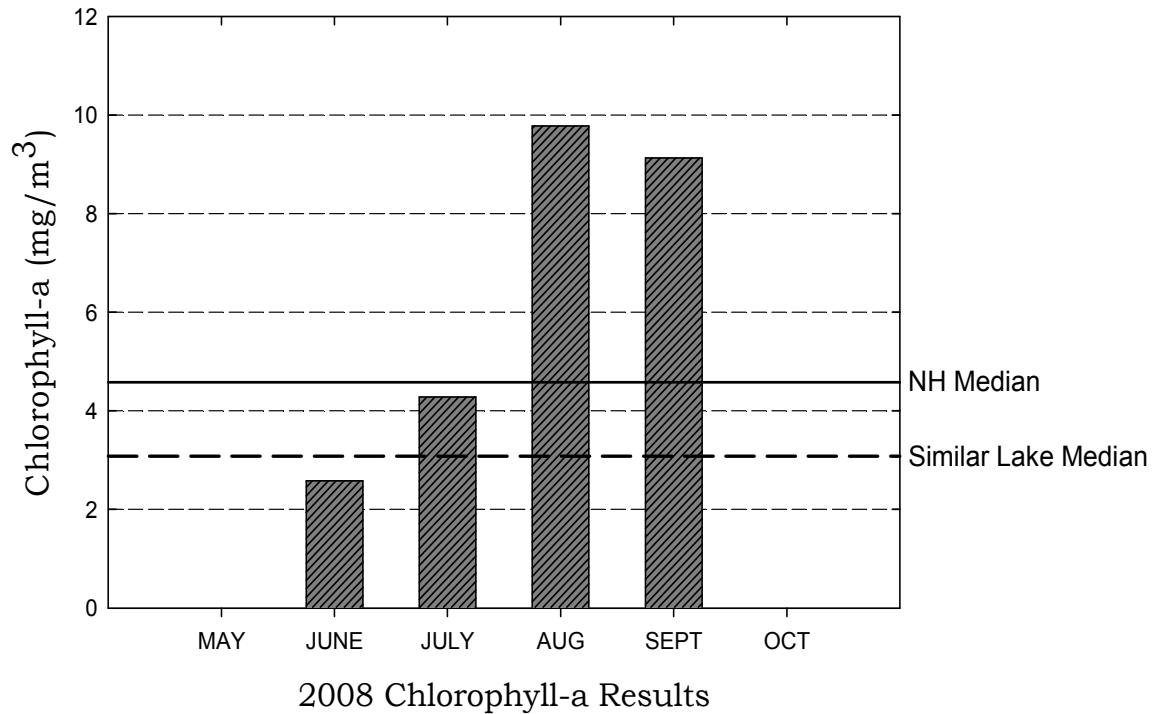
Overall, visual inspection of the historical data trend line (the bottom graph) shows a **variable** in-lake chlorophyll-a trend since monitoring began. Specifically the mean chlorophyll concentration has **fluctuated between approximately 2.46 and 7.30 mg/m³** since **1986**.

While algae are naturally present in all waterbodies, an excessive or increasing amount of any type is not welcomed. Phosphorus is the nutrient that algae typically depend upon for growth in New Hampshire lakes and ponds. Algal concentrations increase as nonpoint sources of phosphorus from the watershed increase, or as in-lake phosphorus sources increase. Increased Chlorophyll-a concentrations can also affect water clarity, causing Secchi-disk transparency to decrease (worsen) and turbidity to increase (worsen).

Therefore, it is extremely important for volunteer monitors to continually educate all watershed residents about management practices that can be implemented to minimize phosphorus loading to surface waters.

Webster Lake, Franklin

Figure 1. Monthly and Historical Chlorophyll-a Results



➤ **Phytoplankton and Cyanobacteria**

Table 1 lists the phytoplankton (algae) and/or cyanobacteria observed in the pond in **2008**. Specifically, this table lists the three most dominant phytoplankton and/or cyanobacteria observed and their relative dominance in the sample.

Table 1. 2008 Dominant Phytoplankton/Cyanobacteria

Sample Date	Division	Genus	% Dominance
6/19/2008	Cyanophyta	Anabaena	57.0
6/19/2008	Bacillariophyta	Tabellaria	22.0
6/19/2008	Chrysophyta	Dinobryon	7.3
7/29/2008	Bacillariophyta	Tabellaria	51.0
7/29/2008	Cyanophyta	Anabaena	35.1
7/29/2008	Chlorophyta	Elakatothrix	7.0

Phytoplankton populations undergo a natural succession during the growing season. Please refer to the “Biological Monitoring Parameters” section of this report for a more detailed explanation regarding seasonal plankton succession. Diatoms and golden-brown algae populations are typical in New Hampshire’s less productive lakes and ponds.

The cyanobacterium **Anabaena** was observed in the **June** and **July** plankton sample. ***This cyanobacteria, if present in large amounts, can be toxic to livestock, wildlife, pets, and humans.*** Please refer to the “Biological Monitoring Parameters” section of this report for a more detailed explanation regarding cyanobacteria.

A cyanobacteria surface scum was noted at the lake on **8/14/2008**. A sample was collected and returned to the DES Limnology Center for analysis. A **lake warning** was issued on **8/15/2008** notifying the public of the presence of potentially toxic cyanobacteria. The cyanobacterium was identified as **Anabaena**, a potentially toxic cyanobacteria. Samples were collected regularly during the advisory period. Cyanobacteria concentrations remained elevated for the remainder of the season. To learn more about cyanobacteria and associated toxin production, please refer to the Data Interpretation section of your report.

Cyanobacteria can reach nuisance levels when phosphorus loading from the watershed to surface waters is increased and favorable environmental conditions occur, such as a period of sunny, warm weather.

The presence of cyanobacteria serves as a reminder of the pond’s delicate balance. Watershed residents should continue to act proactively to reduce nutrient loading to the pond by eliminating fertilizer use on lawns, keeping the

pond shoreline natural, re-vegetating cleared areas within the watershed, and properly maintaining septic systems and roads.

In addition, residents should also observe the pond in September and October during the time of fall turnover (lake mixing) to document any algal blooms that may occur. Cyanobacteria have the ability to regulate their depth in the water column by producing or releasing gas from vesicles. However, occasionally lake mixing can affect their buoyancy and cause them to rise to the surface and bloom. Wind and currents tend to “pile” cyanobacteria into scums that accumulate in one section of the pond. If a fall bloom occurs, please collect a sample in any clean jar or bottle and contact the VLAP Coordinator.

➤ **Secchi Disk Transparency**

Volunteer monitors use the Secchi disk, a 20 cm disk with alternating black and white quadrants, to measure how far a person can see into the water. Transparency, a measure of water clarity, can be affected by the amount of algae and sediment in the water, as well as the natural color of the water. Table 14 in Appendix A lists the current year transparency data. **The median summer transparency for New Hampshire’s lakes and ponds is 3.2 meters.**

Figure 2 depicts the historical and current year transparency *with and without* the use of a viewscope.

The current year *non-viewscope* in-lake transparency **decreased gradually** from **June** to **September**.

It is important to note that as the chlorophyll concentration **increased** at the deep spot as the summer progressed, the transparency **decreased**. We typically expect this **inverse** relationship in lakes. As the amount of algal cells in the water **increases**, the depth to which one can see into the water column typically **decreases** and vice versa.

The current year *viewscope* in-lake transparency **decreased slightly** from **June** to **July** and then **decreased greatly** from **July** to **September**.

The transparency measured with the viewscope was generally **greater than** the transparency measured without the viewscope this summer. As discussed previously, a comparison of the transparency readings taken with and without the use of a viewscope shows that the viewscope typically increases the depth to which the Secchi disk can be seen into the lake, particularly on sunny and windy days. We recommend that your group measure Secchi disk transparency with and without the viewscope on each sampling event.

It is important to note that viewscope transparency data are not compared to a New Hampshire median or similar lake median. This is because lake transparency with the use of a viewscope has not been historically measured by

DES. In the future, the New Hampshire and similar lake medians for viewscope transparency will be calculated and added to the appropriate graphs.

The historical data (the bottom graph) show that the **2008** mean non-viewscope transparency is ***slightly greater than*** the state median and is ***less than*** the similar lake median. Please refer to Appendix D for more information about the similar lake median.

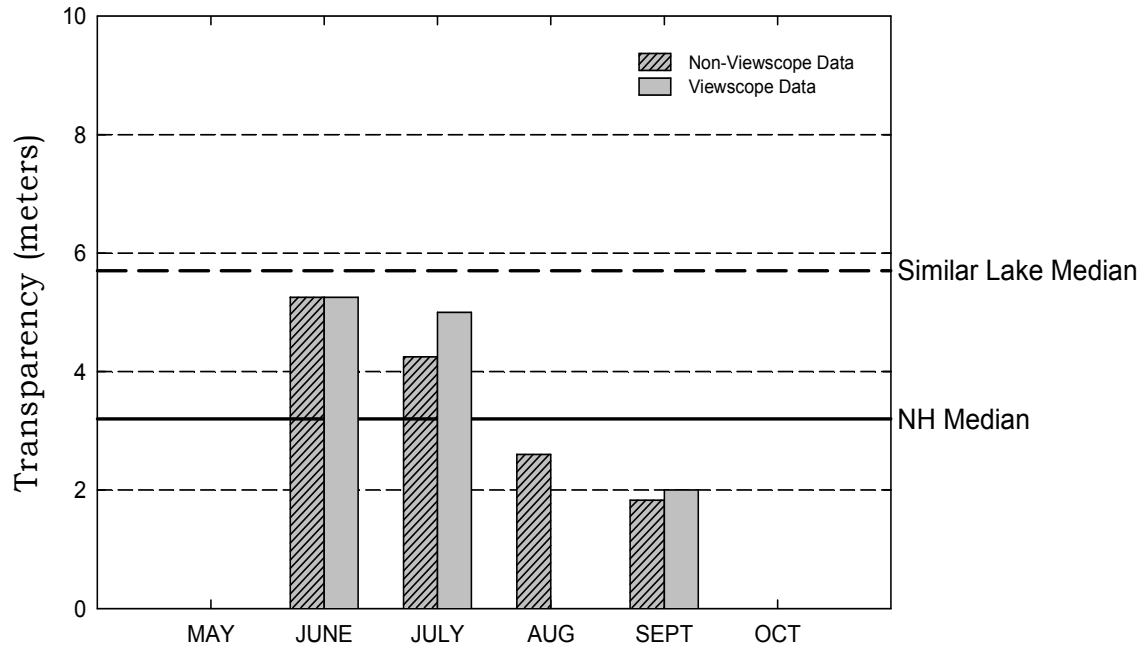
Visual inspection of the historical data trend line (the bottom graph) shows a ***decreasing*** trend, meaning that the transparency has ***worsened*** since monitoring began in **1986**.

Typically, high intensity rainfall causes sediment-laden stormwater runoff to flow into surface waters, thus increasing turbidity and decreasing clarity. Efforts should continually be made to stabilize stream banks, pond shorelines, disturbed soils within the watershed, and especially dirt roads located immediately adjacent to the edge of tributaries and the pond. Guides to best management practices that can be implemented to reduce, and possibly even eliminate, nonpoint source pollutants, are available from DES upon request.

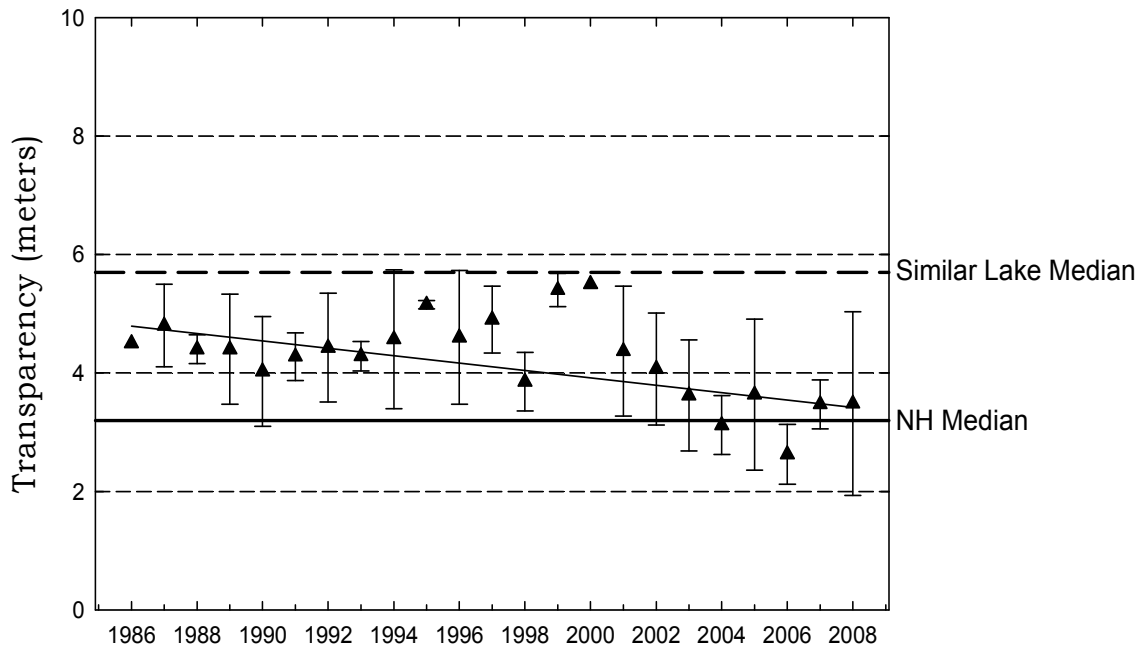
We recommend that your group continue to measure the transparency with and without the use of the viewscope on each sampling event. Ultimately, we would like all monitoring groups to use a viewscope to take Secchi disk readings as the use of the viewscope results in less variability in transparency readings between monitors and sampling events. At some point in the future, when we have sufficient data to determine a statistical relationship between transparency readings collected with and without the use of a viewscope, it may only be necessary to collect transparency readings with the use of a viewscope.

Webster Lake, Franklin

Figure 2. Monthly and Historical Transparency Results



2008 Transparency Viewscope and Non-Viewscope Results



Historical Transparency Non-Viewscope Results

➤ **Total Phosphorus**

Phosphorus is typically the limiting nutrient for vascular plant and algae growth in New Hampshire's lakes and ponds. Excessive phosphorus in a pond can lead to increased plant and algal growth over time. Table 14 in Appendix A lists the current year total phosphorus data for in-lake and tributary stations.

The median summer total phosphorus concentration in the epilimnion (upper layer) of New Hampshire's lakes and ponds is 12 ug/L. The median summer phosphorus concentration in the hypolimnion (lower layer) is 14 ug/L.

The graphs in Figure 3 depict the historical amount of epilimnetic (upper layer) and hypolimnetic (lower layer) total phosphorus concentrations; the inset graphs depict current year total phosphorus data.

The current year data for the epilimnion (the top inset graph) show that the phosphorus concentration **decreased slightly** from **June** to **July**, and then **increased** from **July** to **September**.

The historical data show that the **2008** mean epilimnetic phosphorus concentration is **slightly less than** the state median and is **slightly greater than** the similar lake median. Refer to Appendix D for more information about the similar lake median.

The current year data for the hypolimnion (the bottom inset graph) show that the phosphorus concentration **increased** from **June** to **July**, **remained stable** from **July** to **August**, and then **decreased** from **August** to **September**.

The hypolimnetic (lower layer) turbidity sample was **elevated** on the **July and August** sampling events (**14.1 and 8.7 NTUs**). This suggests that the lake bottom may have been disturbed by the anchor or by the Kemmerer Bottle while sampling and/or that the lake bottom is covered by an easily disturbed thick organic layer of sediment. When the lake bottom is disturbed, phosphorus rich sediment is released into the water column. When collecting the hypolimnion sample, make sure that there is no sediment in the Kemmerer Bottle before filling the sample bottles.

The historical data show that the **2008** mean hypolimnetic phosphorus concentration is **greater than** the state and similar lake medians, and was the lowest mean phosphorus concentration measured since monitoring began. Please refer to Appendix D for more information about the similar lake median.

Overall, visual inspection of the historical data trend line for the epilimnion shows a **variable** phosphorus trend. Specifically, the mean annual epilimnetic phosphorus concentration has **fluctuated between approximately 6 and 28 ug/L** since monitoring began in **1986**.

Overall, visual inspection of the historical data trend line for the hypolimnion shows a **slightly decreasing** phosphorus trend since monitoring began.

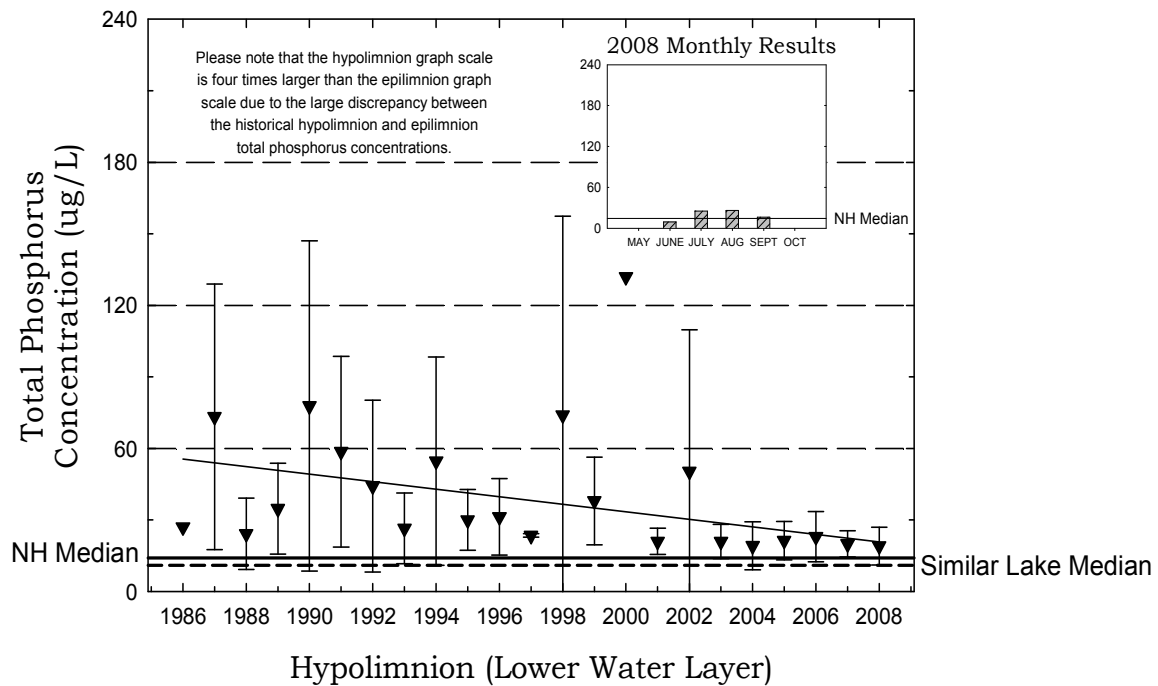
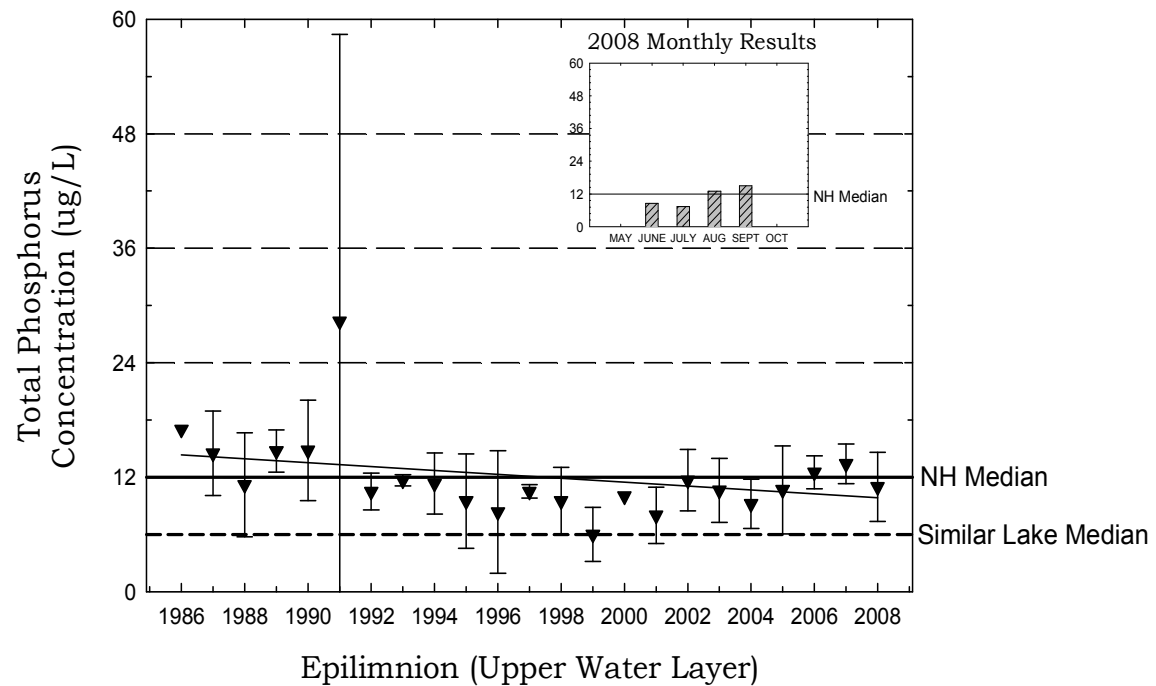
2008

Specifically the mean annual concentration has ***improved*** since monitoring began in **1986**.

One of the most important approaches to reducing phosphorus loading to a waterbody is to continually educate watershed residents about the watershed sources of phosphorus and how excessive phosphorus loading can negatively affect the ecology and the recreational, economical, and ecological value of lakes and ponds.

Webster Lake, Franklin

Figure 3. Monthly and Historical Total Phosphorus Data



➤ pH

Table 14 in Appendix A presents the current year pH data for the in-lake stations.

pH is measured on a logarithmic scale of 0 (acidic) to 14 (basic). pH is important to the survival and reproduction of fish and other aquatic life. A pH below 6.0 typically limits the growth and reproduction of fish. A pH between 6.0 and 7.0 is ideal for fish. The median pH value for the epilimnion (upper layer) in New Hampshire's lakes and ponds is **6.6**, which indicates that the state surface waters are slightly acidic. For a more detailed explanation regarding pH, please refer to the "Chemical Monitoring Parameters" section of this report.

The pH at the deep spot this year ranged from **6.62 to 6.78** in the epilimnion and from **6.02 to 6.56** in the hypolimnion, which means that the water is **slightly acidic**.

It is important to point out that the hypolimnetic (lower layer) pH was **lower (more acidic)** than in the epilimnion (upper layer). This increase in acidity near the bottom is likely due to the decomposition of organic matter and the release of acidic by-products into the water column.

Due to the state's abundance of granite bedrock and acid deposition received from snowmelt, rainfall, and atmospheric particulates, there is little that can be feasibly done to effectively increase pond pH. The pH at the deep spot, however, is sufficient to support aquatic life.

➤ Acid Neutralizing Capacity (ANC)

Table 14 in Appendix A presents the current year epilimnetic ANC for the deep spot.

Buffering capacity (ANC) describes the ability of a solution to resist changes in pH by neutralizing the acidic input. The median ANC value for New Hampshire's lakes and ponds is **4.9 mg/L**, which indicates that many lakes and ponds in the state are at least "moderately vulnerable" to acidic inputs. For a more detailed explanation about ANC, please refer to the "Chemical Monitoring Parameters" section of this report.

The acid neutralizing capacity (ANC) of the epilimnion (upper layer) ranged from **4.4 mg/L to 6.1 mg/L**. This indicates that the lake is **moderately vulnerable** to acidic inputs.

➤ Conductivity

Table 14 in Appendix A presents the current conductivity data for in-lake

stations.

Conductivity is the numerical expression of the ability of water to carry an electric current, which is determined by the number of negatively charged ions from metals, salts, and minerals in the water column. The median conductivity value for New Hampshire's lakes and ponds is **40.0 uMhos/cm**. For a more detailed explanation, please refer to the "Chemical Monitoring Parameters" section of this report.

The conductivity in the lake is relatively **stable**. However, in-lake conductivity levels remain **slightly greater than** the state median. Typically conductivity levels greater than 100 uMhos/cm indicate the influence of pollutant sources associated with human activities. These sources include septic system leachate, agricultural runoff, and road runoff which contains road salt during the spring snow-melt.

It is likely that de-icing materials applied to nearby roadways during the winter months may be influencing the conductivity in the lake. In New Hampshire, the most commonly used de-icing material is salt (sodium chloride).

Therefore, we recommend that the **epilimnion** (upper layer) be sampled for chloride next year. This additional sampling may help us identify what areas of the watershed are contributing to the increasing in-lake conductivity.

Please note that the DES Limnology Center in Concord is able to conduct chloride analyses, free of charge. As a reminder, it is best to conduct chloride sampling in the spring as the snow is melting and during rain events.

➤ **Dissolved Oxygen and Temperature**

Table 9 in Appendix A depicts the dissolved oxygen/temperature profile(s) collected during **2008**.

The presence of sufficient amounts of dissolved oxygen in the water column is vital to fish and amphibians and also to bottom-dwelling organisms. Please refer to the "Chemical Monitoring Parameters" section of this report for a more detailed explanation.

A dissolved oxygen and temperature profile was not collected in 2008 due to unsafe field conditions. We apologize for the inconvenience.

➤ **Turbidity**

Table 14 in Appendix A presents the current year data for in-lake turbidity.

Turbidity in the water is caused by suspended matter, such as clay, silt, and algae. Water clarity is strongly influenced by turbidity. Please refer to the "Other Monitoring Parameters" section of this report for a more detailed

explanation.

The turbidity of the epilimnion (upper layer) sample was ***elevated* (2.25 and 2.36 NTUs)** on the **August** and **September** sampling events. Elevated levels of cyanobacteria were noted throughout the lake during this time, which likely caused the elevated turbidity.

The turbidity of the metalimnion (middle layer) sample was ***elevated* (3.11 and 2.87 NTUs)** on the **August** and **September** sampling events. This suggests that a layer of cyanobacteria may have been present at this location. Algae and cyanobacteria are often found in the metalimnion of lakes due to the differences in density between the epilimnion and the hypolimnion and the resulting abundance of food in that layer.

As discussed previously, the hypolimnetic (lower layer) turbidity was ***elevated* (14.1 and 8.7 NTUs)** on the **August** and **September** sampling events. In addition, the hypolimnetic turbidity has been elevated on many sampling events during previous sampling years. This suggests that the lake bottom may have been disturbed by the anchor or by the Kemmerer Bottle while sampling and/or that the lake bottom is covered by an easily disturbed thick organic layer of sediment. When the lake bottom is disturbed, phosphorus rich sediment is released into the water column. When collecting the hypolimnion sample, make sure that there is no sediment in the Kemmerer Bottle before filling the sample bottles.

TRIBUTARY SAMPLING

➤ **Total Phosphorus**

Table 14 in Appendix A presents the current year total phosphorus data for tributary stations. Please refer to the “Chemical Monitoring Parameters” section of the report for a detailed explanation of total phosphorus.

The phosphorus concentrations in the **Lake Ave. Trib** samples on each sampling event were ***elevated* (170, 210, 140, 450, 130 and 34 ug/L)**, however, the turbidities were ***not elevated***. Phosphorus sources in the watershed can include agricultural runoff, failing or marginal septic systems, stormwater runoff, road runoff, and watershed development. Please contact the VLAP Coordinator in the spring to schedule a site visit and stream survey.

The phosphorus concentration in the **Beaver Brook** sample on the **July** sampling event was ***elevated* (28 ug/L)**, and the turbidity was also ***slightly elevated* (2.46 NTUs)**.

The phosphorus concentration in the **Gagnes Brook** samples on each sampling event were ***slightly elevated* (24, 23, 22, 25, 20, and 19 ug/L)**, and the turbidities were also ***slightly elevated* on the May, June, July, and August** sampling events (***2.56, 1.38, 1.21, and 1.48 NTUs***). The phosphorus concentration decreased slightly as the season progressed in response to the slight decrease in turbidity.

Elevated turbidity levels are most often a result of sediment and/or organic material present in the sample. These materials typically contain attached phosphorus and when present in elevated amounts contribute to elevated tributary phosphorus levels.

➤ **pH**

Table 14 in Appendix A presents the current year pH data for the tributary stations. Please refer to the “Chemical Monitoring Parameters” section of this report for a more detailed explanation of pH.

The pH of the tributary stations ranged from **5.74 to 6.99** and is sufficient to support aquatic life.

➤ **Conductivity**

Table 14 in Appendix A presents the current conductivity data for the tributary stations. Please refer to the “Chemical Monitoring Parameters” section of the report for a more detailed explanation of conductivity.

The **Lake Ave. Trib** has experienced elevated conductivity levels since **2004**. We recommend that your monitoring group conduct a conductivity survey of tributaries with **elevated** conductivity and along the shoreline of the pond to help identify the sources of conductivity. As previously mentioned increasing conductivity typically indicates the influence of pollutant sources associated with human activities. Please contact the VLAP Coordinator in the spring to conduct a site visit and stream survey.

We recommend that your monitoring group conduct stream surveys and rain event sampling along the tributaries with **elevated** conductivity so that we can determine potential sources to the lake.

For a detailed explanation on how to conduct rain event sampling and stream surveys, please refer to the 2002 VLAP Annual Report special topic article, which is posted on the VLAP website at

<http://www.des.nh.gov/organization/divisions/water/wmb/vlap/categories/publications.htm>, or contact the VLAP Coordinator.

To learn how to conduct a shoreline or tributary conductivity survey, please refer to the 2004 special topic article, which is posted on the VLAP website at

<http://www.des.nh.gov/organization/divisions/water/wmb/vlap/categories/publications.htm>, or contact the VLAP Coordinator.

The **Gagnes Brook** has experienced slightly decreasing conductivity levels since monitoring began. This is a good sign indicating the effectiveness of remediation activities on watershed pollution sources.

➤ **Turbidity**

Table 14 in Appendix A presents the current year turbidity data for the tributary stations. Please refer to the “Other Monitoring Parameters” section of the report for a more detailed explanation of turbidity.

The **Beaver Brook** experienced turbid conditions in **July**, likely the result of stormwater runoff from significant rain events prior to sampling. Rainfall creates runoff that washes sediment and organic materials into tributaries causing turbid water conditions. Eventually, the suspended solids settle out once the flow is reduced or the tributary flow enters the lake.

The **Outlet** experienced turbid conditions in **August, September and October**, likely the result of the elevated cyanobacteria levels in the lake. The Outlet is located on the southeastern shore of the lake where predominant winds tend to congregate the cyanobacteria.

➤ **Bacteria (*E. coli*)**

Table 14 in Appendix A lists the current year data for bacteria (*E.coli*) testing.

E. coli is a normal bacterium found in the large intestine of humans and other warm-blooded animals. *E. coli* is used as an indicator organism because it is easily cultured and its presence in the water, in defined amounts, indicates that sewage **may** be present. If sewage is present in the water, potentially harmful disease-causing organisms **may** also be present. Please refer to the “Other Monitoring Parameters” section of the report for a more detailed explanation.

The *E. coli* concentration was **very low** at **Adams Brook, Asplund Brook, Gagnes, Outlet, Robidoux, Rt. 11 Inlet, and Sucker Brook** sampled on the **May, June July, August, and September** sampling events. Specifically, each result was **70 counts or less**, which is **less than** the state standard of 406 counts per 100 mL for recreational surface waters that are not designated public beaches and 88 counts per 100 mL for surface waters that are designated public beaches.

The **Beaver Brook** *E. coli* concentration was **elevated** on the **July** sampling event. However, the **230** counts per 100 mL concentration **was not greater than** the state standard of 406 counts per 100 mL for recreational waters that are not designated public beaches.

If you are concerned about *E. coli* levels at this station, your monitoring group should conduct rain event sampling and bracket sampling in this area to determine the bacteria sources.

For a detailed explanation on how to conduct rain event sampling and stream surveys, please refer to the 2002 VLAP Annual Report special topic article, which is posted on the VLAP website at <http://www.des.nh.gov/organization/divisions/water/wmb/vlap/categories/publications.htm>, or contact the VLAP Coordinator.

The *E. coli* concentration in the **Lake Ave. Trib** samples was **elevated** on the **July, August** and **9/30/2008** sampling events. The **360, 610 and 460** counts per 100 mL concentration **were greater than** the state standard of 406 counts per 100 mL for recreational waters that are not designated public beaches.

The *E. coli* concentration in the **Lake Ave. Trib Upstream** sample was **elevated** on the **9/30/2008** sampling event. The result was **400** counts per 100 mL which is **approximately equal to** the state standard of 406 counts per 100 mL for surface waters.

We recommend that your monitoring group continue to conduct rain event sampling and bracket sampling next year in this area. Please contact the VLAP Coordinator in the spring to conduct a site visit and stream survey. This additional sampling may help us determine the source of the bacteria.

For a detailed explanation on how to conduct rain event sampling and stream surveys, please refer to the 2002 VLAP Annual Report special topic article, which is posted on the VLAP website at <http://www.des.nh.gov/organization/divisions/water/wmb/vlap/categories/publications.htm>, or contact the VLAP Coordinator.

➤ Chlorides

Table 14 in Appendix A lists the current year data for chloride sampling. The chloride ion (Cl⁻) is found naturally in some surface waters and groundwaters and in high concentrations in seawater. Research has shown that elevated chloride levels can be toxic to freshwater aquatic life. In order to protect freshwater aquatic life in New Hampshire, the state has adopted **acute and chronic** chloride criteria of **860 and 230 mg/L** respectively. The chloride content in New Hampshire lakes is naturally low, generally less than 2 mg/L in surface waters located in remote areas away from habitation. Higher values are generally associated with salted highways and, to a lesser extent, with septic inputs. Please refer to the “Chemical Monitoring Parameters” section of this report for a more detailed explanation.

Chloride sampling was **not** conducted during **2008**.

DATA QUALITY ASSURANCE AND CONTROL

Annual Assessment Audit:

During the annual visit to your pond, the biologist conducted a sampling procedures assessment audit for your monitoring group. Specifically, the biologist observed the performance of your monitoring group while sampling and filled-out an assessment audit sheet to document the volunteer monitors’ ability to follow the proper field sampling procedures, as outlined in the VLAP Monitor’s Field Manual. This assessment is used to identify any aspects of sample collection in which volunteer monitors failed to follow proper procedures, and also provides an opportunity for the biologist to retrain the volunteer monitors as necessary. This will ultimately ensure that the samples volunteer monitors collect are truly representative of actual lake and tributary conditions.

Overall, your monitoring group did an **excellent** job collecting samples on the annual biologist visit this year! Specifically, the members of your monitoring group followed the proper field sampling procedures and there was no need for the biologist to provide additional training. Keep up the good work!

Sample Receipt Checklist

Each time your monitoring group dropped off samples at the laboratory this summer, the laboratory staff completed a sample receipt checklist to assess and document if your group followed proper sampling techniques when collecting the samples. The purpose of the sample receipt checklist is to minimize, and hopefully eliminate, improper sampling techniques.

Overall, the sample receipt checklist showed that your monitoring group did a **very good** job when collecting samples this year! Specifically, the members of your monitoring group followed the majority of the proper field sampling

procedures when collecting and submitting samples to the laboratory. However, the laboratory did identify a few aspects of sample collection that your group could improve upon, as follows:

- **Sample holding time:** Please remember to return samples to the laboratory **within 24 hours of sample collection**. This will ensure that samples do not degrade before they are analyzed. If you plan to sample on the weekend, please sample on Sunday, preferably in the afternoon, and return samples to the laboratory first thing on Monday morning to ensure that samples can be analyzed within 24 hours. ***E.coli* samples that are more than 24 hours old will not be accepted by the laboratory for analysis.**
- **Sample bottle volume:** Please fill each sample bottle up to the neck of the bottle where the bottle curves in. This will ensure that the laboratory staff will have enough sample water to conduct all of the necessary tests.

Please be careful to not overflow the small brown bottle used for phosphorus sampling since this bottle contains acid. If you do accidentally overflow the small brown bottle, please rinse your hands and the outside of the sample bottle and make a note of this on your field sampling sheet. The laboratory staff will put additional acid in the bottle in the laboratory to preserve the sample.

USEFUL RESOURCES

Best Management Practices to Control Nonpoint Source Pollution: A Guide for Citizens and Town Officials, DES Booklet WD-03-42, (603) 271-2975 or www.des.nh.gov/organization/commissioner/pip/publications/wd/documents/wd-03-42.pdf.

Cyanobacteria in New Hampshire Waters Potential Dangers of Blue-Green Algae Blooms, DES fact sheet WMB-10, (603) 271-2975 or www.des.nh.gov/organization/commissioner/pip/factsheets/wmb/documents/wmb-10.pdf.

Erosion Control for Construction in the Protected Shoreland Buffer Zone, DES fact sheet WD-SP-1, (603) 271-2975 or www.des.nh.gov/organization/commissioner/pip/factsheets/sp/documents/sp-1.pdf.

Impacts of Development Upon Stormwater Runoff, DES fact sheet WD-WQE-7, (603) 271-2975 or www.des.nh.gov/organization/commissioner/pip/factsheets/aot/documents/wqe-7.pdf.

Lake Protection Tips: Some Do's and Don'ts for Maintaining Healthy Lakes, DES fact sheet WD-BB-9, (603) 271-2975 or www.des.nh.gov/organization/commissioner/pip/factsheets/bb/documents/bb-9.pdf.

Proper Lawn Care In the Protected Shoreland, The Comprehensive Shoreland Protection Act, DES fact sheet WD-SP-2, (603) 271-2975 or www.des.nh.gov/organization/commissioner/pip/factsheets/sp/documents/sp-2.pdf.

Road Salt and Water Quality, DES fact sheet WD-WMB-4, (603) 271-2975 or www.des.nh.gov/organization/commissioner/pip/factsheets/wmb/documents/wmb-4.pdf.

Shorelands Under the Jurisdiction of the Comprehensive Shoreland Protection Act, DES fact sheet SP-4, (603) 271-2975 or www.des.nh.gov/organization/commissioner/pip/factsheets/sp/documents/sp-4.pdf.

Watershed Districts and Ordinances, DES fact sheet WD-WMB-16, (603) 271-2975 or www.des.nh.gov/organization/commissioner/pip/factsheets/wmb/documents/wmb-16.pdf.